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(12) **United States Patent**  
Seo et al.(10) **Patent No.:** US 7,517,470 B2  
(45) **Date of Patent:** Apr. 14, 2009(54) **ORGANIC-INORGANIC HYBRID MATERIAL, COMPOSITION FOR SYNTHESIZING THE SAME, AND MANUFACTURING METHOD OF THE SAME**

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C09B 57/10 (2006.01)  
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C09D 1/00 (2006.01)  
C09D 7/12 (2006.01)(52) **U.S. Cl.** ..... 252/62.3 Q; 252/62.3 R;  
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252/521.3; 428/917; 106/287.17; 106/287.18;  
106/287.19(58) **Field of Classification Search** ..... 428/917;  
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See application file for complete search history.

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(74) *Attorney, Agent, or Firm*—Cook Alex Ltd.(57) **ABSTRACT**

An organic-inorganic hybrid material comprising a metal oxide and a chelating ligand is synthesized. The function of a coloring property, a light-emitting property, or semiconductivity of the organic-inorganic hybrid material can be controlled by chelating ligand. The organic-inorganic hybrid material is prepared by sol-gel method using sol which includes a metal alkoxide and/or a metal salt and a functional chelating agent.

**22 Claims, 13 Drawing Sheets**